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EXAMINER	
Kevin Quarterman	
ART UNIT	**PAPER NUMBER**
2879	12

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INTERVIEW SUMMARY

All participants (applicant, applicant's representative, PTO personnel):

(1) Kevin Quarterman (3) Vip Patel

(2) James Strom (4)

Date of Interview 12/18/02

Type: ☐ Telephonic ☑ Personal (copy is given to ☐ applicant ☑ applicant's representative).

Exhibit shown or demonstration conducted: ☐ Yes ☑ No If yes, brief description:

Agreement ☐ was reached. ☑ was not reached.

Claim(s) discussed: Independent claims 1, 28, 29, 31, & 34

Identification of prior art discussed: Ueoka et al. US 6,034,474

Description of the general nature of what was agreed to if an agreement was reached, or any other comments: A discussion over the filter characteristics in relation to the prior art was held. Mr. Strom gave detailed explanation of the particular features of filter and how it attenuates emitted light. Examiner will consider any drafted claim submitted to the Office.

(A fuller description, if necessary, and a copy of the amendments, if available, which the examiner agreed would render the claims allowable must be attached. Also, where no copy of the amendments which would render the claims allowable is available, a summary thereof must be attached.)

1. ☑ It is not necessary for applicant to provide a separate record of the substance of the interview.

Unless the paragraph above has been checked to indicate to the contrary. A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION IS NOT WAIVED AND MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a response to the last Office action has are ready been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW.

2. ☐ Since the Examiner's interview summary above (including any attachments) reflects a complete response to each of the objections, rejections and requirements that may be present in the last Office action, and since the claims are now allowable, this completed form is considered to fulfill the response requirements of the last Office action. Applicant is not relieved from providing a separate record of the interview unless box 1 above is also checked.

Examiner Note: You must sign this form unless it is an attachment to another form.

VIP PATEL
PRIMARY EXAMINER

FORM PTOL-413 (REV.1-96)

INTERVIEW AGENDA

OVERVIEW OF PRESENT INVENTION

The present invention achieves greater color reproduction in a manner not before possible.

A feature is that a filter selectively absorbs light generated by a discharge gas. This filter may also absorb some of the desired light emitted by one of the elements that is fluoresced by the discharge gas light.

The intensity of light emitted by the element that is affected by the filter can be increased, relative to the other elements by, for example, a structural change. Thus, the contribution of the discharge gas light to the final emission of the display is reduced while the contribution of the affected element is maintained.

This approach is not obvious because filtering the discharge light would be expected to adversely affect the emission of an element's light. And simply increasing the intensity of the discharge light would defeat the purpose.

The present invention combines at least two novel observations: (1) discharge light may be filtered more than the light of a similarly colored element (e.g. red), and (2), the intensity of that element may be increased without increasing the intensity of the discharge light (e.g. a structural difference causes greater emission by the element while the discharge light intensity is unchanged).

It is known that a filter can be used on the front of a PDP for absorbing the color of emitted light.

However, none of the cited references disclose adjustment of intensity of light emitted by fluorescent bodies for compensating for attenuation of light absorbed by the filter.

PRIOR ART - UEOKA

According to Ueoka, because the intensity of light emitted by fluorescent bodies is not adjusted, the inensity of light emitted by a specific fluorescent body weakens and thus color balance is lost by disposing a filter to absorb the color of light generated by the discharge gas.

CLAIM FEATURES FOR DISCUSSION

Claim 28

"light within the wave range is emitted with intensity to compensate for attenuation of light within the wave range absorbed by the filter"

PROPOSED CLAIMS 1 AND 2

"a filter to receive the emitted first color that is warmer than the whitish second color, and adjusting the warmer first color to the whitish second color by selectively attenuating light in an emission wavelength region of the discharge gas"

REJECTIONS UNDER § 112

Rejections based on the phrase "... larger/less than would be necessary to reproduce the whitish color intended for display". The rejection proposes that it is unclear what would be necessary to reproduce the whitish color intended for display.

Each of the rejected claims recites what is necessary to reproduce the color. For example, claim 2 recites "a light-emission intensity of the first display element is higher than would be necessary to reproduce the whitish color to be displayed by using a combined light emission of the first to third display elements that is not received by said filter". What would be necessary to reproduce the color would be to display the color without the filter.

Claims 1 and 2 are shown amended, the remaining claims are shown for convenience.

1. (THREE TIMES AMENDED) A gas discharge display device for displaying a color image, comprising:

first, second and third fluorescent substances having different emission colors, wherein said first, second, and third fluorescent substances are set to emit, in combination and before selective attenuation, a first color that is warmer than a whitish second color, where the whitish second color is [when] a color to be finally displayed after selective attenuation [using the display device is the whitish color]; and

a filter to receive the emitted first color that is warmer than the whitish second color, and adjusting the warmer first color to the whitish second color by selectively attenuating light in an emission wavelength region of the discharge gas.

2. (TWICE AMENDED) The gas discharge display device of claim 1, wherein

a structural dimension of a first display element corresponding to said first fluorescent substance is different from structural dimensions of second and third display elements corresponding to said second and third fluorescent substances,

wherein the filter selectively attenuates by [partially blocks] blocking the light emitted by the first element more than it blocks the light emitted by the second and third element, and

a light-emission intensity of the first display element is higher than would be necessary to reproduce the whitish color to be displayed by using a combined light emission of the first to third display elements that is not received by said filter.

3. (AS TWICE AMENDED) The gas discharge display device of claim 2, wherein

each of the display elements comprises a pair of electrodes to generate an electric discharge between the electrodes to allow the fluorescent substances to emit light, and

the dimension condition is a surface area of the electrodes.

4. (AS TWICE AMENDED) The gas discharge display device of claim 3, wherein the surface area of the electrodes in the first display element is larger than a surface area that would be necessary to reproduce the whitish color intended for display by using the combined light emission of the first through third display elements that is not received by said filter.

5. (AS TWICE AMENDED) The gas discharge display device of claim 2, wherein

each of the display elements comprises a pair of electrodes to generate electric discharge between the electrodes to allow the fluorescent substances to emit light, and

the dimension condition of each display element is an area of a light-emission region of the fluorescent substance.

6. (AS TWICE AMENDED) The gas discharge display device of claim 5, wherein the area of the light-emission region of the fluorescent substance comprises a fluorescent substance layer in the first display element that has an area that is larger than what would be necessary to reproduce the whitish color intended for display by using a combined light emission of the display elements that is not received by said filter.

7. (AS TWICE AMENDED) The gas discharge display device of claim 2, wherein

each of said display elements comprises

a pair of electrodes to generate an electric discharge between the electrodes to allow the fluorescent substances to emit light, and

dielectric substance layers that cover the respective electrodes, and

the structural dimension is a thickness of the respective dielectric layers.

8. (AS TWICE AMENDED) The gas discharge display device of claim 7, wherein the thickness of the dielectric substance layers in said first display element is less than what would be necessary to reproduce the whitish color intended for display by using a combined light emission of the display elements that is not received by said filter.

9. (AS TWICE AMENDED) The gas discharge display device of claim 1, wherein a light-emission intensity of a first display element corresponding to said first fluorescent substance is higher than an intensity that would be necessary to reproduce the whitish color intended for display by using a combined light-emission of first through third display elements corresponding to said first to third fluorescent substances that is not received by said filter.

10. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein said filter has a color correction function for increasing a color temperature value.

11. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein said filter attenuates an intensity of light in a red wavelength region.

12. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein said filter has a characteristic such that an average transmissivity of light in a green wavelength region is lower than an average transmissivity of light in a blue wavelength region, and higher than an average transmissivity of light in a red wavelength region.

13. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein within a red wavelength region, said filter has a characteristic such that a transmissivity of a longer wavelength is higher than a transmissivity of a shorter wavelength.

14. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein said filter has a characteristic such that a wavelength providing the lowest transmissivity has a value within a range of 560 to 610 nanometers.

15. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein said filter has a characteristic such that absorption peaks appear at least in a wavelength region of 470 to 520 nanometers and in a wavelength region of 560 to 610 nanometers.

16. (AS ONCE AMENDED) The gas discharge display device of claim 1, further comprising a pair of substrates for forming a discharge space therebetween, and wherein said filter is formed directly on an inner or outer surface of one of said substrates that constitutes a display surface.

17. (AS ONCE AMENDED) The gas discharge display device of claim 1, further comprising a display panel having a discharge space therein with arranged display elements, and wherein said filter is fabricated separately from said display panel and disposed on a front side of said display panel.

18. (AS ONCE AMENDED) The gas discharge display device of claim 1, further comprising a display panel having a discharge space therein with arranged display elements and a transparent protection plate for protecting a display surface of said display panel, and wherein said filter is disposed on an inner or outer surface of the protection plate.

19. (AS TWICE AMENDED) The gas discharge display device of claim 1, wherein said filter is a pigment filter.

20. (AS TWICE AMENDED) The gas discharge display device of claim 1, wherein said filter is a multi-layer film filter.

21. (AS ONCE AMENDED) The gas discharge display device of claim 1, wherein said first fluorescent substance is a fluorescent substance for red composed essentially of (Y, Gd) B03 : Eu, said second fluorescent substance is a fluorescent substance for green composed essentially of Zn2Si04 : Mn, and said third fluorescent substance is a fluorescent substance for blue composed essentially of BaMgA110017 : Eu.

22. (AS ONCE AMENDED) The gas discharge display device of claim 1, further comprising a discharge space filled with a Penning gas composed essentially of neon and xenon as a discharge gas.

28. (AS ONCE AMENDED) A gas discharge display device using a plasma display panel, comprising:

a plurality of discharge cells formed within a discharge space between a front substrate and a rear substrate, each of the discharge cells including a discharge gas therein and being provided with one of fluorescent substances of first, second, and third fluorescent substances selected to emit light for performing color display; and

a filter having a characteristic of absorbing light within a wave range of visible light emitted by the discharge gas, the filter being disposed on a front side of the front substrate, wherein a light-emission intensity of at least one of the fluorescent substances is set to be larger than would be necessary to display an intended white light by simultaneous unfiltered light emission of the fluorescent substances, so that light within the wave range is emitted with intensity to compensate for attenuation of light within the wave range absorbed by the filter.

29. (AS UNAMENDED) A display apparatus for displaying a target color, comprising:

a pixel comprising a first, second, and third cell, each cell comprising a discharge gas and a substance, where the discharge gas emits a discharge light that enters the substance of the cell causing the substance to emit an emission light, whereby each cell emits a color that is a combination of the discharge light and the emission light of the cell, and wherein the color of each cell is different from that of the other cells; and

a filter attenuating the discharge gas light of the first, second and third cells more than it attenuates the emission light of the first cell.

30. (AS UNAMENDED) The apparatus of claim 29, wherein the color emitted by the first cell is constructed to have an intensity greater than necessary to reproduce, in combination with the color emitted by the second and third cells, the target light.

31. (AS UNAMENDED) A display apparatus, comprising:

a discharge gas emitting a discharge light that includes a first red light;

a cell of a pixel having a substance that, in response to being irradiated by the discharge light, emits a second red light; and

a filter attenuating the first red light more than it attenuates the second red light.

32. (AS UNAMENDED) The apparatus of claim 31, wherein the intensity of the second red light is increased in proportion to its attenuation by the filter.

33. (AS UNAMENDED) The apparatus of claim 32, wherein the intensity of the second red light is increased by modifying a physical dimension of the cell, which includes a physical dimension of the substance of the cell.

34. (ONCE AMENDED) A gas discharge display device comprising:

a plurality of discharge cells formed within a discharge space between a front substrate and a rear substrate, the discharge cells including a discharge gas therein and being provided with first, second, and third fluorescent substances of red, green and blue, the fluorescent substances being selected to emit light for performing color display; and

a filter having a characteristic of absorbing light within a wave range of visible light emitted by the discharge gas, the filter being disposed on a front side of the front substrate, wherein a light-emission intensity of at least one of the fluorescent substances is set to be larger than would be necessary to display an intended white light by simultaneous unfiltered light emission of the fluorescent substances, so that light within the wave range is emitted with intensity to compensate for attenuation of light within the wave range absorbed by the filter.

35. (AS UNAMENDED) The gas discharge display device of claim 34, wherein

a structural dimension of a first display element corresponding to said first fluorescent substance is different from structural dimensions of second and third display elements corresponding to said second and third fluorescent substances,

wherein the filter partially blocks the light emitted by the first element, and

a light-emission intensity of the first display element is higher than would be necessary to reproduce the whitish color to be displayed by using a combined light emission of the first to third display elements that is not received by said filter.

36. (AS UNAMENDED) The gas discharge display device of claim 35, wherein

each of the display elements comprises a pair of electrodes to generate an electric discharge between the electrodes to allow the fluorescent substances to emit light, and

the dimension condition is a surface area of the electrodes.

37. (AS UNAMENDED) The gas discharge display device of claim 36, wherein the surface area of the electrodes in the first display element is larger than a surface area that would be necessary to reproduce the whitish color intended for display by using the combined light emission of the first through third display elements that is not received by said filter.

38. (AS UNAMENDED) The gas discharge display device of claim 35, wherein

each of the display elements comprises a pair of electrodes to generate electric discharge between the electrodes to allow the fluorescent substances to emit light, and

the dimension condition of each display element is an area of a light-emission region of the fluorescent substance.

39. (AS UNAMENDED) The gas discharge display device of claim 38, wherein the area of the light-emission region of the fluorescent substance comprises a fluorescent substance layer in the first display element that has an area that is larger than what would be necessary to reproduce the whitish color intended for display by using a combined light emission of the display elements that is not received by said filter.

40. (AS UNAMENDED) The gas discharge display device of claim 35, wherein

each of said display elements comprises

a pair of electrodes to generate an electric discharge between the electrodes to allow the fluorescent substances to emit light, and

dielectric substance layers that cover the respective electrodes, and

the structural dimension is a thickness of the respective dielectric layers.

41. (AS UNAMENDED) The gas discharge display device of claim 40, wherein the thickness of the dielectric substance layers in said first display element is less than what would be necessary to reproduce the whitish color intended for display by using a combined light emission of the display elements that is not received by said filter.

42. (AS UNAMENDED) The gas discharge display device of claim 34, wherein a light-emission intensity of a first display element corresponding to said first fluorescent substance is higher than an intensity that would be necessary to reproduce the whitish color intended for display by using a combined light-emission of first through third display elements corresponding to said first to third fluorescent substances that is not received by said filter.

43. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter has a color correction function for increasing a color temperature value.

44. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter attenuates an intensity of light in a red wavelength region.

45. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter has a characteristic such that an average transmissivity of light in a green wavelength region is lower than an average transmissivity of light in a blue wavelength region, and higher than an average transmissivity of light in a red wavelength region.

46. (AS UNAMENDED) The gas discharge display device of claim 34, wherein within a red wavelength region, said filter has a characteristic such that a transmissivity of a longer wavelength is higher than a transmissivity of a shorter wavelength.

47. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter has a characteristic such that a wavelength providing the lowest transmissivity has a value within a range of 560 to 610 nanometers.

48. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter has a characteristic such that absorption peaks appear at least in a wavelength region of 470 to 520 nanometers and in a wavelength region of 560 to 610 nanometers.

49. (AS UNAMENDED) The gas discharge display device of claim 34, further comprising a pair of substrates for forming a discharge space therebetween, and wherein said filter is formed directly on an inner or outer surface of one of said substrates that constitutes a display surface.

50. (AS UNAMENDED) The gas discharge display device of claim 34, further comprising a display panel having a discharge space therein with arranged display elements, and wherein said filter is fabricated separately from said display panel and disposed on a front side of said display panel.

51. (AS UNAMENDED) The gas discharge display device of claim 34, further comprising a display panel having a discharge space therein with arranged display elements and a transparent protection plate for protecting a display surface of said display panel, and wherein said filter is disposed on an inner or outer surface of the protection plate.

52. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter is a pigment filter.

53. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said filter is a multi-layer film filter.

54. (AS UNAMENDED) The gas discharge display device of claim 34, wherein said first fluorescent substance is a fluorescent substance for red composed essentially of (Y, Gd) B03 : Eu, said second fluorescent substance is a fluorescent substance for green composed essentially of Zn2Si04 : Mn, and said third fluorescent substance is a fluorescent substance for blue composed essentially of BaMgA110017 : Eu.

55. (AS UNAMENDED) The gas discharge display device of claim 34, further comprising a discharge space filled with a Penning gas composed essentially of neon and xenon as a discharge gas.